REMARKS

Claims 1-2, 4-33, and 37-41 are pending in the application. By the present amendment, claims 1-2, 7-20, 22-29, 31-33, and 37-40 have been amended, and claims 4-5 have been canceled. Therefore, upon entry of the present amendment, claims 1-2, 4-33, and 37-41 will be subject to examination.

The Allowable and Allowed Claims

Claim 25 has been held to be directed to allowable subject matter and has been rewritten in independent form to include all the limitations of the base claim and of all intervening claims. Claim 25 has further been amended to remove all reference numerals and correct minor informalities.

Applicant gratefully acknowledges that claims 28-30 have been allowed, and has amended claims 28-30 only to remove reference numerals and to correct minor informalities.

The Rejections under 35 USC 103(a)

A. Claims 1-2, 7-20, 22-29, 31-33, and 37-40 have been amended to remove reference numerals and correct minor informalities. Claims 1 and 37 have also been amended to point out Applicant's invention with greater clarity, in view of the references cited by the Examiner.

B. The rejection of claims 1-2, 4-12, 15, 18-21, 23-24, 26-27, 31-33 and 37-41 as obvious under USPN 6,095,484 to Frankel ("Frenkel") in view of USPN 4,214,604 to Rumsey ("Rumsey") is respectfully traversed at least for the following reasons.

Frenkel discloses a spring diaphragm for shut-off valves and regulators. More particularly, Frenkel discloses that the diaphragm consists of two storeys disposed one over the other (col. 2, ll. 50-52), that the lower storey is a scarcely deformable, thin, stiff sheet made of materials such as cotton or nylon (col. 3. ll. 25-26), and that ribs may disposed radially on the surface of the diaphragm opposite to the bonnet (col. 3, ll. 37-41) and in a direction perpendicular to the flow of fluid (FIG. 4). Further, Frenkel discloses a valve body that does not have inlet and outlet sleeves with cross-sectional profiles that turns from circular at the external ports to semi-elliptical at the fluid flow chamber.

Therefore, Frenkel does not anticipate Applicant's independent claims 1 and 37 because, among other things, Applicant's claimed invention includes a single storey diaphragm, is made of an elastomeric material, contains a plurality of ribs that are disposed on the side of the diaphragm facing the bonnet and that are parallel to the flow of a fluid (parallel the shorter axis of the ellipsoid), and because Applicant's claimed invention includes a valve body with inlet and outlet sleeves that turn from circular at the external ports to elliptical at the fluid flow chambers.

The deficiencies of Frenkel are not remedied by combining Frenkel with Rumsey. Rumsey is not believed to teach a diaphragm with the properties claimed in independent claims 1 and 37, and even if such a combination were possible (which Applicant disputes), combining Frenkel with Rumsey would changes the principles of operations of Frenkel or Rumsey. Further, Rumsey teaches away from the limitations of claims 1 and 37.

Rumsey teaches a valve having a wedge-shaped diaphragm with a generally triangular cross-section. Rumsey, col. 6, ll. 39-44; FIG. 1. Therefore, Rumsey does not teach a valve having a diaphragm with the construction claimed by Applicant.

Rumsey also teaches that valves with weirs are undesirable, and that its straight-through design was developed to eliminate weirs. Rumsey, col. 1, ll. 1-39; col. 8, ll. 60-66. It is well settled that a proposed combination cannot change the principle of operation of a reference (here, combining Frenkel's design based on a weir with Rumsey's design that was developed to eliminate weirs), and that references that teach away from the proposed combination indicate non-obviousness of the claimed invention (Rumsey teaches away from using weirs). MPEP 2143.02.VI; 2141.03.VI.

Moreover, in *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (2007), the Supreme Court held that, in determining obviousness, a reason to combine must be present and that hindsight must be avoided. The Examiner has justified the proposed combination as obvious "to improve fluid parameters." Applicant respectfully submits that this argument is conclusory in nature and, accordingly, based only on impermissible hindsight.

As evidence of non-obviousness, Applicant points out that Rumsey was issued 20 years before Frenkel, and that, even if the combination of Frenkel and Rumsey were possible (which Applicant disputes), Frenkel did not incorporate the teachings of Rumsey in his invention, but instead developed an elaborate diaphragm design in order to overcome the increase in the active area of the diaphragm caused by increases in valve sizes.

In his rebuttal of Applicant's previous remarks, the Examiner has argued that no limitations in the Applicant's claims are directed to preventing Frenkel's admitted problem of bulging of the diaphragm. Applicant respectfully directs the Examiner to the limitations in claims 1 and 37 related to the diaphragm, and to the explanations in the specification of why the claimed diaphragm design prevents bulging. See, for example, paragraphs [0054]-[0055] of the published application.

Applicant further notes that the above arguments of inoperability and teaching away of the proposed combination of Frenkel with Rumsey were presented in previous amendments but have not been rebutted.

The claims depending from independent claims 1 and 37 are non-obvious over the cited combination at least for the same reasons as independent claims 1 and 37, and for the additional limitations contained therein. For example, claim 13 has been rejected because the Examiner has equated a tooth to a boss. Applicant submits that such a holding would make claims 12 and 13 identical and vitiate claim differentiation.

C. The rejection of claims 1-2, 4-11, 15, 18-22, 24, 26-27, 31-33 and 37-40 as obvious over USPN 3,349,795 to Matsutani ("Matsutani") in view of Rumsey and Frenkel is respectfully traversed.

Matsutani teaches a diaphragm valve having a ceramic casing and further having portions of the inlet and outlet sleeves that are arched. Matsutani, FIG. 1a; col. 1, ll. 11-15. More particularly, Matsutani does not teach that the cross-sections of the inlet and outlet sleeves turn from circular at the ports to semi-elliptical at the fluid flow chamber, and that the diaphragm is constructed as claimed by Applicant.

The Examiner has relied on Rumsey and Frenkel to fill the deficiencies of Matsutani. Rumsey and Frenkel have been discussed in the preceding section. As shown, neither Rumsey nor Frenkel provide the missing elements to achieve the invention claimed in Applicant's independent claims 1 and 37, and such proposed combination would change the principles of operation of one or more of the cited references. Moreover, the cited references also teach away from Applicant's invention, indicating that such a combination, even if it were possible, may be based only on impermissible hindsight.

Concerning the claims depending from independent claims 1 and 37, those claims are non-obvious over the cited combination at least for the same reasons as independent claims 1 and 37, and for the additional limitations contained therein, which differentiate the dependent claims from the dependent claims and from one another.

Conclusion

It is believed that al objections and rejections have been addressed, and that the application is now in condition for allowance. A notice to that effect is respectfully requested.

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Respectfully submitted,

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